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II.

SYSTEMS OF OFFENSE AND DEFENSE IN NAVAL WARFARE.

Any one who undertakes to write under the above heading must invite the indulgence of his readers on a very large scale, so much mystery exists as to what really is the best system to follow in naval warfare, and as to what would be the result should two hostile fleets of equal power meet in fair fight. Since the war ending in the year 1815, it may be said that a mere minimum of experience has been arrived at; in the great American civil war, if we leave out the action of the torpedo, then quite in its infancy, the naval fighting was almost all on one side. During the war between Italy and Austria the Italian fleet, at the battle of Lissa, took so little part in the fighting, from some unaccountable reason, that the gallant Tegetoff had it all his own way. In the so-called Crimean War the Russian fleet remained in port, not daring to face the English and French squadrons; and, barring some futile attacks made by the combined fleets on the Russian forts, nothing was done by the naval forces. In fact, excepting for the sake of doing *something*, and perhaps losing two or three ships for the sake of the butcher's bill, no result could possibly be arrived at during a war where no enemy's ships put in an appearance, unless, indeed, by an overwhelming force of light-draught gun, torpedo, and mortar boats, specially constructed for attacking the forts and strongholds of the enemy. It would be well to mention, by-the-by, that the English and French fleets did attack the forts at Sebastopol, a heavy attack at the same time being made by the joint armies, on which occasion the fleets lost many men with no result whatever. In the Franco-German War no naval engagement took place, the French fleet contenting itself by looking from afar at the German strongholds. We now come to the late war between Turkey and Russia, and there again we did not arrive at any practical result, as, from motives I cannot understand, the Russian Baltic fleet never attempted to move out of its own waters, and the two or three much-talked-about, strangely-shaped iron-clads, the pets of Admiral Popoff and Mr. Reed, thought it better never to show their noses at sea, though never more than three Turkish iron-clads could be spared from their arduous duties of protecting Sulina and Batoum, carrying troops, provisions, etc., to cruise on the Crimean coast. In this, however, I do not blame the commanders of the Russian iron-clads, as, in my humble opinion, these much-talked-of Popoffskas are utterly unfitted to face an enemy at sea. Seeing, therefore, how little experience has been hitherto acquired on which to base an argument respecting the class of vessel best adapted for naval warfare, I can only offer on this subject my own opinions and observations. England, for example, doubtless requires large cruisers, vessels wherewith to defend her colonies. Should they be iron-clads, heavily plated, or fast wooden vessels, heavily armed, with compartments so well fitted that, if one or two should fill with water through being pierced by a shot, the vessel would not sink?

Admiral Farragut, who was one of the most intelligent naval officers of my acquaintance, with whom I had many conversations on this question, was of opinion that the latter class of vessel is the best. Still I can but think that when one nation has a fleet of iron-clad vessels, other nations could not meet her ships on equal grounds if they had only wooden vessels. Admitting, then, for the sake of argument, that iron-clad vessels are an absolute necessity, we come to the question, "What kind of iron-clad is best adapted for modern warfare?" In such a case I think the first point to be arrived at is speed; the second, handiness in manœuvring; the third, sea-going qualities; and the fourth that the vessel should show as small a mark as possible to the enemy's heavy guns, to his torpedoes, and to his rams. In attacking forts (a thing I think out of date, unless by way of making a diversion in conjunction with land-forces), all these points, excepting perhaps the third, are very important. Now, as regards the first necessary qualification, many competent men say that you cannot get speed with small, short ships. In this, with the greatest respect, I must venture to differ. I think it is only a question of horse-power and the shape of the vessel *under water*. Some of the small Turkish monitors, I found, kept speed better than the large frigates. Secondly, as to handiness in manœuvring, every sailor knows how much easier a short vessel manœuvres than a long one, and, in these days when ships carry enormous armaments, and guns of the heaviest calibre, a small vessel would, to use a somewhat vulgar expression, hop round the long craft like a "cooper round a cask," firing on her ponderous adversary from positions where her (the larger vessel's) guns would not bear, poking her with her rams, and in fact worrying her life out. For example, suppose that two or three small monitors attack a frigate four times their own size, they would, if not capture her, give her what is called in America "a bad time of it." Thirdly, sea-going qualities. I have had some experience in monitors, such as were supplied to the Turkish Navy by English builders, vessels with high free-boards, carrying four 18-ton guns in fixed batteries, which guns could fire in a line with the keel. Several such vessels I had with me in very heavy weather in the Black Sea for fourteen months, and I found that they made as good weather as, if not better than, the heavier frigates, and that in point of speed they were even superior to them. In regard to the fourth qualification, namely, that vessels should show as small a mark as possible to the enemy. There can be no question as to the smaller vessels having this advantage, not only as regards gunnery, but in relation to torpedo-attacks, with which newly-invented war-weapons it would be much easier to strike a large object than a small one. Of course, in making these remarks it is difficult to employ, in relation to England, with her huge fleets, an argument that will apply to states with smaller navies. To the former, ships of all classes are necessary for the protection of her trade and flag over the boundless seas where it flies, but I will take as an example America, and ask what sort of a navy she requires to protect her honor and fame as a naval power. In the event of war America's first thought would naturally be the safety of her magnificent ports, and if adventurous privateers are (as they certainly would be) fitted out for the destruction of her enemy's commerce, they would not be in the category of men-of-war. What seems to be the requirement of America is small, swift, heavily-armed iron-clads, to dart out at all hours and seasons and harass an enemy's blockading squadron. To these should be added the new, fearful, and demoralizing weapon, the torpedo, of which more anon, and I can but think that no blockading force could ever hold its own off an American port which contained a small, efficient squadron, consisting of such vessels as I refer to, in its waters. It must be borne in mind that the blockading squadron must be always on the *qui vive*, while those inside could choose their own time and opportunity in making their attacks. There must be many persons who will remember how, when torpedoes were quite in their infancy, and when no ships of any sort existed in Charleston on the Confederate side, the frequent night attacks of the enemy harassed the American blockading fleets cruising off that port, and how much damage was done by the yet undeveloped torpedo.

As regards America, if I might venture to give an opinion, I would say that, if, in each of her fortified seaports, such as New York or Boston, three or four small monitors, and a dozen or two of torpedo-boats, were stationed, the inhabitants might sleep quietly in their beds, more so, indeed, than the crews of the enemy's ships outside the port. When I say monitors I refer to vessels with high free-boards, mounting four guns in fixed batteries (tonnage about 1,200 tons). The reason I say high free-boards is, that such vessels might be able to go to sea at any moment, regardless of the weather, thus depriving the enemy of that repose which bad weather so often brings in naval operations. The vessels I suggest should be similar to those built for the Turkish Government by the Thames Iron-Works and Messrs. Samuda on the Thames, at the cost of about £125,000, including guns; thus five of them could be obtained for the price of one such huge sea-monster as the Inflexible.

I would now, for a moment, refer to Admiral Farragut's opinion as to fast, heavily-armed wooden vessels ultimately replacing iron-clads. The gallant admiral, whose loss as a sailor the whole world must deplore, gave his opinion on this point some years ago. Since that time iron-clad frigates, such as he condemned, have been superseded by such gigantic ships as those of the Inflexible class, whose speed is as great as has yet been arrived at by anything afloat, be it wooden or be it iron. Now, it must be clear that, although at long shots a wooden vessel would be as destructive to her enemies as an iron craft, and that her sailing qualities would probably be superior, she must come to close quarters with her iron-clad enemy before she would be able to capture her, and that, in that case, not only would the armor-cased vessel have the best of it, but, with her ramming power and her immense weight, she would be by far the superior vessel at close quarters. Thus I fear that we cannot quite give up iron yet, though I admit that it is just possible we may be obliged to make some radical change in iron-clad sea-going ships. Already the English Government, and the English naval men, are fully aware that some, nay, nearly all, of their broadside iron-clads are practically useless—in the first place, because many of them, having been built years ago, are too lightly armored and armed to compete with the huge ships now building and built, and that thus they are, though iron-clads, of very little use, and the British public are pinning their faith on vessels of the Inflexible and Thunderer class, that are, indeed, vessels to make an enemy tremble to look on. They have the great advantage of having their decks protected from shot. They have not the huge masts and rigging, one morsel of which getting foul of the screw the vessel is at the mercy of her enemy, be that enemy ever so small a vessel. They are armed with guns that it would have seemed almost a fable to talk about a very few years ago. They have enormous speed, and they carry coal for about twenty days' full speed. Still, the cost is fearful. The English Government, as well as other governments, are beginning to open their eyes to the fact that small, heavily-armed iron-clads will be *the* ships of the future. Such vessels have all the attributes I mentioned as necessary—namely, speed, heavy guns, sea-going qualities, and powers of manœuvring quickly. Last, but not least, they are economical. I can but think that if my friend Admiral Farragut were alive he would agree in this proposed change in naval architecture: not that I would ignore the necessity of a certain number of fast wooden cruisers, heavily armed, especially for convoys of merchant-vessels, and for the purpose of harassing an enemy's trade; but, if the world will persist in having iron armor, and every one decides to wear it, all must be in the same boat, or he who goes uncased will get his ribs broken.

Having given my humble opinion on the class of iron-clads the best adapted to naval warfare, I will now venture an opinion as to how future war will be carried on in regard to naval combats, and the destruction of an enemy's commerce, this latter striking a blow at his most vital part, namely, his pockets. Let us suppose, in regard to the first of these propositions, that two fleets meet on the open seas bent on mortal combat, their commanders-in-chief crammed (as they are naturally enough at present) full of theory as to how they would fight a hostile fleet should it ever fall to their lot to do so. They talk and think of double line, single line, double column or single column, etc. Well, Monsieur le Commandant en chef, there is your enemy drawn up in line of battle before you—rams, torpedoes, and all other deadly inventions, prepared; the commander-in-chief will probably hold a council of war, and according to an arranged plan in goes the fleet at the enemy. If the enemy remains quiet, as in a sham fight, good; but he (the enemy) also is prepared with his system of attack, and before the action has lasted five minutes all plans *must be disconcerted*, the commander-in-chief's signals unseen or disregarded, and everything pell-mell; ships frequently ramming their friends, torpedoes going off in the wrong direction or at a wrong time, and who knows what will happen? I have often thought for hours (while commanding the Turkish fleet) as to what I should do were I to meet an enemy's fleet, and I have come to the conclusion that much must depend on the chapter of accidents. In these days there is too much theory—still I don't see what else we can have—too much calculation, perhaps too much science, in naval men's brains. For my part, I am convinced that the first thing to do is to be most careful in your choice of captains, to have confidence in them, and to leave much to their discretion during a naval engagement. I do not say that I disapprove of a well-digested plan being laid down to start with, but I doubt its being carried out with success, as in the old days of sailing-vessels, when weather-gauges were profited by, and when seamanship was half the battle. I can but think that every captain of an iron-clad will have to fight his own ship, irrespective of the commander-in-chief. Above all, the commander-in-chief of a fleet should avoid placing his ships in too close order. A good thing was said by an English officer of rank some days before the fatal accident so well known to all the world which occurred lately to the German fleet off Dover. The Germans have the dangerous habit of sailing their fleets in close order. The officer I refer to, being asked what course he would pursue if obliged to attack the German fleet, answered, "I should let them alone, being sure that they would sink each other by collisions in a very short space of time through manœuvring in close order." Thus my opinion is that "open order, individual responsibility, and freedom of action to each commander," should be the order to be given by the commander-in-chief. There are many naval officers who trust entirely to destroy the enemy by ramming. I can only say to them, "Your idea is good in theory, but remember that two can play at that game." By all means use your ram when an enemy is crippled; in fact, I think that all fleets should be attended upon by ram-vessels, who should lie by until one of the enemy's ships is in difficulty, and then rush at the injured ship with their ram. Guns in such vessels are almost superfluous. To sum up this question, I think that a commander-in-chief's motto should be, "Keep your ships in hand as long as possible, then leave the rest to good captains, brave crews, well-worked guns, and Providence."

Now as regards injuring an enemy's commerce, ability to do which is of the greatest importance in war. Fast ships with long-range guns are necessary to carry out this undertaking; valuable cargoes traversing the ocean will generally be escorted by vessels-of-war, and the line of action of these fast ships should be to make an occasional dash in among the convoy, to attack and pick up lagging ships, etc.; and, when chased by the vessels-of-war forming the escort, they must, through their superior speed, be able to escape. I take it that for the purposes of carrying valuable cargoes in war-time fast steamers will be used; this seems to me the only plan, and will make their capture exceedingly difficult, as a vessel so employed will rush from port to port at full speed, while the cruiser must necessarily be economizing fuel, and lying watching for his prey under easy steam. An evidence on this head was given by the way in which the English blockade-runners passed through the American blockading squadrons during the civil war in America. Smokeless coal is also very requisite, otherwise a cruising-vessel can be seen frequently at from twenty to thirty miles' distance.

One word as to blockade. According to international law, blockade to be recognized should be efficient; whoever made this law showed themselves, perhaps, clever lawyers, but ignorant of their subject. Any one who, like myself, has had experience in the practice of blockades, knows how utterly impossible it is with the finest fleet and the cleverest organization to make a blockade efficient in the true sense of the word, and the sooner some clear understanding is arrived at as to what is meant by "efficient blockade" the better. A curious controversy arose between Russia and Turkey on the question of prizes during the late war. The commander of the Turkish fleet was unable to spare ships for the purpose of maintaining anything like a strict blockade of the Russian ports, as his vessels were engaged in the defense of Sulina and Batoum, carrying troops, munitions of war, etc.; so it seemed to him that, considering all the trade of the Black Sea must pass through the straits of the Bosporus *en route* to Europe, the prevention of vessels passing through those straits would virtually blockade the Russian ports. In this view one or two European governments agreed, but others, taking into consideration the very loose meaning or general acceptance of the word "efficient," demurred, and refused to admit that vessels coming from Russian ports captured at the entrance of the Bosporus were good prizes. Of course, this is a peculiar case. Still it should be remembered that, in the American war, vessels which had evaded the blockade of the Southern ports were chased or picked up anywhere on the high-seas until they arrived to within three miles (the limit of national water) of the islands in the West Indies. There must be some change made in the law of blockade, especially as to the expression, "Blockades, to be acknowledged such, must be efficient," or the greatest possible complications will arise hereafter. I had an idea, while cruising off the Russian ports during the late war, of blockading by means of torpedoes, that is to say, by laying torpedoes outside those laid down by the enemy; but, unfortunately, I had not the means to do so supplied to me. I wonder if such a plan would have been considered an "efficient blockade?" I feel pretty confident that had torpedoes been as far advanced as they are at the present moment, the Americans would have placed the contact torpedo off the ports of Charleston and Wilmington, and thus at once put a stop to all the successful blockade-running that took place during the late civil war between the Northern and Southern States of America.

I will now say a few words on the great question of the day, one that is puzzling all thinking men's minds. I refer to the torpedo question. Are these fearful and already demoralizing weapons of modern warfare to play the destructive part expected of them, or are they to be met by means of defense that will to a great extent paralyze their action? My experience tells me that they are not to be despised, as I have seen the oldest and bravest sailors tremble at the very thought of them. I will give your readers some of my experience in them, which if not large is perhaps more than that of most persons. As I said in the beginning of this article, the Russians did not count it wise to send their magnificent fleet into the Mediterranean to try issues with the Turkish naval squadrons. In the Black Sea they certainly were not in sufficient force to venture out of their ports, so there they decided to take the offensive with torpedoes, and during the whole of the war they were constantly making attacks with every description of torpedo on the Turkish fleets. In the Danube they succeeded in destroying (through, it must be admitted, a bad lookout having been kept) one small gunboat with the spar torpedo, and at the Sulina mouth a similar vessel was destroyed by the overconfidence of her captain, who followed a Russian flotilla over water where the enemy had been manœuvring for several days, and had laid down many contact torpedoes; this vessel was naturally blown up by the trap laid for her. But even in the Danube failure after failure occurred during the Russian torpedo-attacks; and in the Black Sea, though many desperate and carefully-organized attacks were made, not one Turkish vessel was injured in any way whatever by them. The first attack was made off the Sulina mouth of the Danube, where four Turkish ships were lying at anchor; the precautions that were taken against torpedo-attacks being a cordon of boats round the ships, and a steam-tug lying about half a mile ahead of the squadron. The boats were armed with small guns, riflemen, etc., on board the ships mitrailleuses and field-pieces were mounted on the gunnels, and, as the attack was to a certain extent expected, a good lookout was kept. It seems that a Russian steamer, taking five torpedoes in tow, left Odessa shortly after dark. On arriving to within some ten miles from the Turkish squadron, the boats steamed away from their escort, and as the lighthouse at the Sulina mouth was lighted on account of the neutrality of the Danube navigation commission who owned it, they had no difficulty in approaching the Ottoman ships. On they came, gallantly enough, till within a mile or so distant they were seen or heard by the lookout steamers, who at once gave the alarm, and then the row began. One steam torpedo-boat, however, managed to run the gantlet of the guard-boats, and came through them bravely at the headmost Turkish ship. No one knows exactly what happened, except that the torpedo on the spar at the boat's bows went off harmlessly, the torpedo-boat capsized and went down, and the officer who commanded her and all his crew were picked up floating about in the water. What became of the other torpedo-boats was never known. Some say that another may have been sunk in the *mêlée*; the Russian account says, however, that the other four vessels regained their steamer escort, and were towed back to Odessa. Several other attacks by steam-launches armed with the spar-torpedo were made on the Turkish squadrons which were cruising and otherwise employed in the Black Sea, sometimes when the men-of-war were at anchor, sometimes while they were cruising—all with the same result, namely, failure.

The most remarkable of these attacks was made by four torpedo-boats on a single iron-clad man-of-war lying at anchor off Souhounkali, on the coast of Circassia. The steamer with which were the torpedo-boats kept a long way off in the offing, and approached after nightfall. It so happened, curiously enough, that a total eclipse of the moon took place about midnight. The shrewd Muscovites, profiting by the temporary darkness caused by the phenomenon, dispatched their torpedo-launches against their intended victim the moment the moon was obscured and utter darkness prevailed. But the Turkish commander was quite equal to the occasion: his boats were as usual rowing guard round his ship, and his swinging booms rigged out to represent torpedospars. Unhappily, the Turks had no torpedoes. On the approach of the torpedo-boats a tremendous fire was opened upon them from the boats and from the vessels at anchor. Again, as at Sulina, the greatest confusion prevailed; the commanders lost their presence of mind, or found the fire too hot for them, I know not which. All I can vouch for is that, although one torpedo-boat did fire off her weapon, the result of which was a volume of smoke and water, the latter actually wetting the deck of the Turkish ship, no harm was done, and before the end of the eclipse had cleared the moon the attack was over, and the steam-launches cried, "Sauve qui peut!" Not a scratch was made on the iron-clad; and yet, a few days afterward, we saw in the Russian newspapers the following notice: "Gallant exploit of our naval officers; a Turkish iron-clad destroyed;" and, in the next day's *Gazette*, a long list of officers made bishops, or some similar high grade awarded. This reminds me of a grand flourish of trumpets that was made in Russia, headed, "Turkish iron-clad driven off and nearly captured by a Russian merchant-steamer," a long description being given of the gallant action: how men, dressed as English officers, were picked off by the unerring rifles of the sailors of the Russian merchant-vessel, of the rivers of blood on the decks of the said merchant-vessel, etc. Here, again, more bishoprics were given, and stars glittered *en masse* on the gallant conquerors' breasts. What happened *truly* on this occasion was this: A Turkish monitor was making a passage from Constantinople to Sulina, her deck loaded with heavy guns to be mounted at that place. She saw at a distance one of the Russian armed merchant-steamers, that had the habit of making a dash out of Sebastopol or Odessa and destroying any Turkish merchant-vessel that came in her way. The Turkish ship, loaded as she was, chased for half an hour, and fired a shot or two at the vessel, which pluckily enough returned the fire from a long light gun mounted on her upper deck. One shot from this gun did hit the funnel of the Turkish ship; after this the merchant-craft, having the legs, was soon away out of sight. "Voilà tout!" However, we must not begrudge the honors given "faute de mieux" to our gallant enemies—and gallant indeed they are when they have real opportunities. That no one can deny.

I now return to my experience in torpedo warfare, which, I take it, is more interesting to your readers than my little anecdotes of Russian brag. Finding that, as used by them, the pole-torpedo could not, where a good lookout was kept, avail, the Russian Government decided upon using the more deadly fish or Whitehead torpedo. This weapon is projected at a distance of about a thousand yards, and when tried against imaginary enemies was found to have apparently a most deadly effect; but it will be seen how widely different firing at an object which does not return the fire or in any way shake the much-required coolness of action or, as it is called, presence of mind, is from firing at a wide-awake enemy who is taking every precaution and means to resist and ward off an attack. I was cruising with several vessels, watching the Black Sea, when I received information that a well-organized attack was preparing against the fleet anchored at Batoum. I immediately went to that place to look after the safety of the Turkish ships. Two or three nights after my arriving there the attack was made, which I will endeavor to describe. The Turkish guard-boats were rowing guard about four hundred yards ahead of the men-of-war, which, I must state, were anchored with their bows to seaward, their sterns being hauled in to the shore. Unhappily, we were not provided with electric lights, nor had we any steam-launches, the latter having been all sent for service into the Danube. At about midnight, the night being very dark and hazy, an alarm was given by the guard-boats that something was moving about in the dark. Scarcely had the alarm been given, when a thing like a rocket on the top of the water was seen rushing from the darkness in the direction of the ships at anchor, then another, then another. The boats were immediately recalled, and a heavy fire opened from the ships into the dark in the direction from which these mysterious machines were seen to be coming. Now let us see what these things were, and what was their action. They were Whitehead or fish torpedoes, hurled at our ships from a vessel, vessels, or boats, outside the harbor. The first struck one of the iron-clads just abaft the fore-chains, knocked its foremost part in like a man's hat when he is what is called bonneted, *did not explode*, but cannoned off as it were to the shore, where it was found and identified, as before mentioned, as a fish-torpedo. The second rushed past close to the broadside of the flag-ship, struck her stern-chain, which it polished like burnished steel, and went on shore, where it also was captured, in a very perfect state. The third disappeared somewhere under water, and has not since been seen. I am told that five were fired, but of this I have no proof. Now, why was this attack, so well arranged, so successful to a certain point, so well provided with the newest inventions, why, I ask, was it a failure?

On this head there is a diversity of opinion. Some say that the Russians had neglected to take out the safety-pins, thus leaving the torpedoes as it were on half-cock. At all events, some great error was made in the execution of this grand plan whereby the Turkish squadron, consisting of eleven vessels, lying in Batoum, were to have been blown up in the twinkling of an eye. Now, I will give my humble opinion as to why it failed. In the first place, to find Batoum is no easy matter—not a light to be seen, not a mark to be made out in the night; high mountains close at the back of the strange little harbor, rendering the low land which forms it almost impossible to discern; distances very deceiving; no soundings except in very deep water, the description of the bottom (that great help to the pilot who attends to his soundings)—all these difficulties to be overcome. Then the steam-launches must be sent away some distance from the port, and they, too, have to creep about a long time before they can find out their proper position for attack. The officers and crew, tired with hunting about to discover their whereabouts, at last find themselves in view of a forest of masts. The dark hulls, lying so close to the shore, are hidden by the shade of the land. The enemy they are going to attack is evidently on the lookout, as a guard-boat or two are seen flitting about in the darkness between them and their prey. So at last they fire, and take their chances of success. This seems to me to a certain extent the solution of the problem of failure. But, then, again, why did not the torpedoes explode on striking their object? This is to me a mystery. Scientific men, who examined the torpedoes on their arrival at Constantinople, declare that they were not in a state of preparation to go off—that is, they were half-cocked; but this can be to a great extent only conjecture, as the torpedoes had been pulled about by many curious people before they were officially examined by scientific eyes. Here, again, we have a decided failure of torpedo-attacks, whether from ignorance of the right method of manipulating this newly-invented and dangerous weapon, or for what reason, I leave my readers to conjecture. I have given them the facts as they occurred, and so leave the question, in doing which I will make the following remarks as to my opinion of the efficacy of this new method of warfare.

I am, like many others, much puzzled to say what will be the effect of the torpedo in the next naval war. I think that, with a very good lookout, with electric lights so arranged that the whole (not a portion—that is *most* dangerous) of the horizon is made clear as day (and it is probable that, with some alterations in the present system of light, this may be arrived at), a torpedo-attack, or rather a successful one against ships lying at anchor, may be prevented. Nets round the ships will doubtless be most efficacious also. I again speak of vessels at anchor. But your reader will ask, "How about vessels under way?" On this point I venture to think that a blockading squadron may be dreadfully harassed by large numbers of torpedo-vessels, choosing their own time and weather, making dashes out of the blockaded port.

Then, again, how about torpedoes in a naval engagement? In the present day many ships are so fitted that they can, or pretend they can, fire torpedoes out of their ports as from guns. I hardly suppose that this system has been brought to perfection; but, even should it be, there will always be the danger of hitting a friend instead of an enemy, as in a future naval combat, if fleets are engaged, ships will be passing and repassing, and much confusion will be the result.

I shall be told that this is applicable to shot and shell as well as torpedoes, but the latter are much the most dangerous weapon to play with. It has been said that torpedo-boats with spar-torpedoes could be lowered during an engagement, and sent against an enemy. This seems to me a feasible plan; but I cannot help thinking that the spar-torpedo projecting from the side of the ship, as in the American men-of-war, would be still better.

There is yet another class of torpedo to be employed as a weapon of defense that I imagine will be used with much efficacy in coming wars. I refer to the torpedo that is fixed on the ground, or anchored to float sufficiently near to the surface to explode when a vessel strikes it. These torpedoes are much used in Europe. It is necessary, however, that they should be under the protection of the guns of forts or floating batteries, otherwise they could easily be picked up by creeping for them. The ground-torpedo is fired by a wire connected with a battery from the shore; this also requires to be powerfully protected, otherwise the connecting wire can be discovered, lifted off the ground, and cut. Even when under the protection of batteries they could be sometimes destroyed in the way above mentioned. There are many other ways in which the efficacy of torpedoes has been tried, but some real practice in war is necessary before any decided idea can be formed of the powers of this newly-invented weapon of destruction.

I have not mentioned the Harvey or the chase torpedoes, because I have no great faith in their value; but, as there may be different opinions about their efficiency, it will be as well to say a few words on the subject. As to the former, I am quite prepared to admit the ingenuity of this invention, and doubtless much pains has been taken by its originator to make the most of his idea. Now, the Harvey torpedo is a weapon which requires that the vessel which is to be its victim be placed in a certain position before she can be attacked. To a vessel unable, from injury or otherwise, to move, I can perfectly conceive that the Harvey torpedo might prove fatal; but even then her guns could play on the attacking vessel armed with the Harvey torpedo, and they could hardly be expected to remain idle. This description of torpedo is well known; I will therefore dismiss it, while giving the opinion that, except in very peculiar cases, it is useless. The other torpedo is a weapon proposed to be used during a chase, and is supposed to be dropped overboard by the vessel chased, and so arranged that, by being placed under two buoys which are extended by a bar about ten feet apart, it should entangle itself round the bows of a chasing vessel, and so blow her up. There is such a minimum of chance in the success of this apparatus that I think it may be deemed useless. I believe that an idea exists of firing torpedoes from the broadside-ports of ships. This is done by means of shoots being placed on the side of the ship, through which the torpedo is thrown from a framework especially prepared, and so into the water. From what I can understand, however, this system so far has been found of doubtful success, as, during the time of the transit through the air from the ship into the water, the torpedo is affected in some way, which seems to spoil its direction after immersion.

I will now endeavor to give some idea of what I think is the best method for defense against torpedoes. The Turkish Navy, from want of proper appliances, had to use the most simple and ordinary methods of defense. For vessels lying at anchor I think the best plan is, if acting against boats armed with pole or spar torpedoes, a cordon of boats at anchor, with everything ready for slipping or cutting the cable, a light, buoyant rope connecting each boat with its next in line. Supposing that one or even half a dozen spar-torpedo-boats make a dash against a squadron of ships, they could never succeed if this cordon were properly placed, and a good lookout kept by means of steam-vessels stationed ahead and astern of the men-of-war. Even should a torpedo-boat, profiting by the darkness of the night, make a dash through this cordon, she must foul the ropes, and draw the boats on either side upon her. Thus I dismiss the supposed danger of torpedo-boats in an attack on a squadron.

Now we come to a much more serious question: the attack on ships by the deadly Whitehead torpedo. Ships to defend themselves while at anchor from this attack should be guarded by good electric lights, that will show the boats advancing to the attack. They should also have wire nets round them, and fast steam-launches should be hovering about, ready to attack on their part the advancing enemy. Much may be done in evading an attack in this way by Thornecraft's steam-launches, armed with Whitehead torpedoes. Still the greatest care and the most minute precautions must be taken.

I have already mentioned the great danger to blockading squadrons that would accrue from sudden attacks made by boats dashing out of the blockade harbors. In this case, when ships are under way, nets cannot be used as a protection, so that nothing is left but *éclairage* of the horizon and a good lookout.

I think that I have now exhausted my subject as regards the best class of ships adapted for naval warfare; I have only omitted one class, which, though last, is not by any means the least. I refer to the transport service. For this service no nation is so well supplied as England, and even in English ships I believe a very essential element is wanting. It is true that the British ships have splendid speed, plenty of room for coal, carry many troops, possess well-ventilated decks; but they are not armed, in my opinion, as they should be. I should suggest that every transport have four or six Krupp guns of great range. With such guns they could play at long balls as well as any iron-clad, and, if chased, could annoy the enemy by raking his decks, perhaps knocking away a spar, the cordage of which might foul his screw, etc. I say Krupp guns, because they seem to me to be lighter, and have a longer range in proportion to their weight, than any guns that have come under my notice. However, we will say long, light guns with a long range. As a proof of what such guns can do, I will mention that, in the late war between Russia and Turkey, Krupp guns with a long range were stuck all over several flimsy Russian merchant-steamers, which frequently ventured out into the Black Sea to destroy Turkish ships of commerce, and when chased by heavy iron-clads they found it easy to escape.

In giving these opinions, I trust I have not presumed. I have merely stated my ideas, formed to a great extent from experience acquired in actual service.

HOBART PASHA.